

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

In re Application of LOENING et al.

Serial No. 10/593,333

Filed: September 09, 2006

For: COOLING AND PURIFICATION OF GAS STREAMS

DECLARATION

I, Jan-Martin Loening, Dr. Dipl.-Ing., a citizen of the Federal Republic of Germany and residing at Wenjenstr. 33, D- 67251 Freinsheim, Germany, declare as follows:

I am a fully trained chemical engineer, having studied chemical engineering from October 1992 to August 1997 at the Technical University of Clausthal.

I obtained my doctor's degree from said University in February 2001.

Since 2001, when I joined BASF SE of 67056 Ludwigshafen, Germany, I have been working in the field of the following technologies:

Technical development of gas absorption and extraction and Technology Plastizisers and Solvents

I am well acquainted with the subject matter of Application Serial No. 10/593,333 and have carefully studied the cited references.

The object of the invention disclosed and claimed in Application Serial No. 10/593, 333 is the improvement on the colling and purification of dimethylterephthalate (DMT) containing gasstreams by way of a two stage treatment at different temperatures as specified on page 1 of the said application.

In order to show that the two stage process according to of Application Serial No. 10/593,333 does show unexpected results and improvements, I have investigated the following setups:

Single stage scrubbing and cooling of the gas stream with 1,4-butanediol has been investigated with the same dimensions (same column diameter, same relevant heights of internals) as in the given example in US Appl. Ser. 10/593,333. The temperature of the 1,4-butanediol as the liquid feed to that single stage column have been:

Comparative example a)  $T = 124^{\circ}\text{C}$

Comparative example b)  $T = 60^{\circ}\text{C}$

Gas and liquid in the column have been in counter flow.

#### Conclusion

The results show that in example a) ( $T = 124^{\circ}\text{C}$ ) a significant reduction of the DMT content in the gas phase is achieved but the cooling of the gas stream is insufficient (temperature of the off gas stream =  $124.3^{\circ}\text{C}$ ). Another drawback of this example is the increasing loss of 1,4-butanediol (1.9 kg/h according to 4.6 w.-% 1,4-butanediol in the off gas) from the top of the column.

In example b) ( $T=60^{\circ}\text{C}$ ) a significant cooling of the gas stream is achieved. The outlet temperature in this case is  $60.1^{\circ}\text{C}$ . In comparison with example a) also the loss of 1,4-butanediol is reduced to 0.022 kg/h (= 0.06 w.-% 1,4-butanediol in the off gas). The drawback of this single stage column setup is a supersaturation of the gas phase with DMT in the column and in the gaseous outlet of the column. The supersaturation ends up in the formation of DMT aerosols by sublimation from the gas phase.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information or belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed at 67056 Ludwigshafen, Germany, this 23 day of June 2010.

Signature of Declarant

